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Comments to:

Docket No. FAA-1999-5483 -21
Notice No. 99-03

Parachute Operations
Notice of Proposed Rulemaking

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COMMENTS TO NOTICE NO. 99-03

In response to the Notice of Proposed Rulemaking (NPRM), Notice No. 99-03, these comments are submitted by the United States Parachute Association, a not-for-profit organization representing some 34,000 people who enjoy the sport of skydiving. A common theme will be found throughout our remarks-strong support for continuation of the concept of self-regulation of skydiving. Since the 1962 inception of federal regulations for skydiving, the FAA has focused its resources on ensuring the safety of air **traffic** and the non-participating public. The agency has relied upon USPA and its predecessor organizations to advance and promote the safety of the sport. We believe that this mutual partnership has been an overwhelming success. One reason for such success has been the FAA's willingness to leave skydiving safety matters in the hands of skydiving experts, namely the USPA. As a result, USPA diligently guards its "self-regulating" authority allowed by the FAA. In the following comments, we respectfully note areas of the proposal that we believe erode that authority. Our disagreements are raised in the interest of maintaining the highest and safest industry standards, along with the symbiotic relationship between USPA and the FAA that has worked so well.

The sport of skydiving, also known as parachuting, is enjoying intense interest among the public, resulting in phenomenal growth. USPA estimates that over 3.25 million individual jumps are made every year. Even with intensified activity, we believe that high levels of safety are being maintained, particularly with respect to safety of air traffic and the safety of persons and property on the ground. We believe that the FAA's chief focus should continue to be on maintaining safety of air traffic and the safety of persons and property on the ground. However, as we will point out in the following comments, there are aspects of the proposal in which the FAA assumes a greater safety role for skydivers themselves, infringing upon USPA's long-standing role that has been accepted by the FAA for decades.

With respect to air traffic, USPA takes great exception to statements in the preamble that cite "numerous incidents" of near mid-air collisions (NMAC) with skydivers and their jump aircraft. The preamble referred to numerous Aviation Safety Reporting (ASR) System reports, with the caveat that ASR reports cannot be used to infer the prevalence of that problem within the National Airspace System. The FAA then used those reports to justify proposing changes to air traffic control (ATC) notification and communication procedures. We have reviewed a number of the ASR reports ourselves. We conclude that many pilots submit reports **after** being surprised by the proximity of skydivers or the jump plane. In many cases, we believe the skydive operation was safely and legally conducted in full communication with ATC, and that adequate separation existed from non-participating aircraft. However, the non-participating pilot was not informed of, or not aware of the jump activity and was surprised by the skydiving event. Though the subsequent ASR report may have been tiled as a NMAC, in fact, adequate separation existed. That said, we generally support the proposed changes for notification and communication with ATC.

Following is our section-by-section response.

\$105.5 General

Create a Hazard

Under Section 105.5, the FAA proposes, *“No person may conduct a parachute operation, and no pilot in command of an aircraft may allow a parachute operation to be conducted from an aircraft, if that operation creates a hazard to air traffic or to persons or property on the surface.”*

This section continues the current language which holds the pilot responsible for any hazard created by anyone at anytime during the parachute operation. This is patently unfair to the pilot, who should not face enforcement proceedings for hazardous actions performed by skydivers long after they leave the aircraft. The current rule was developed in the 1960’s when skydivers had very little maneuverability either in freefall or under round, military-surplus canopies. Today’s skydivers have far greater maneuverability, both in freefall and under ram-air parachutes. Clarifying language is desired throughout the rule that makes it clear that the FAA recognizes that skydivers have the responsibility by themselves to avoid creating a hazard to air traffic or to persons or property on the ground.

USPA proposes the following new paragraph for the section:

“No person or parachutist may conduct a parachute operation, if that operation creates a hazard to air traffic or to persons or property on the surface. No pilot in command of an aircraft may allow a parachute operation to be conducted from that aircraft, unless all reasonable measures within the pilot’s control are taken to ensure that a hazard is not created.”

§ 105.13 Radio Equipment and Use Requirement

Radio Communication with ATC

In the first sentence of paragraph (a)(1)(ii), the FAA proposes, *“Radio communications have been established between the aircraft and the air traffic control facility having jurisdiction over the affected airspace at least five minutes before the parachute operation begins.”*

We support the concept of requiring radio communications with the air traffic control facility having airspace jurisdiction, replacing the current requirement to contact the nearest ATC facility or FAA flight service station. In practice, we believe that radio contact is typically made with the proper ATC facility (the facility having airspace jurisdiction), despite the current language. This change brings the regulation in conformity with the correct practice. However, we believe additional language is required to make clear that communications should be established with the ATC facility having jurisdiction of the airspace at the intended exit altitude(s). This is especially necessary in airspace where different facilities have airspace jurisdiction at different altitudes over the same point.

USPA proposes the following change to the sentence:

“Radio communications have been established between the aircraft and the air traffic control facility having jurisdiction over the ~~affected~~ airspace of intended exit altitude(s) at least five minutes before the parachute operation begins.”

Parachutists and Radio Communications

In (a)(1)(ii) the FAA also proposes, “... *The pilot in command and the parachutists on that flight must have established radio communications to receive information regarding air traffic activity in the vicinity of the parachute operation.*”

It is impractical to include “the parachutists on that flight” within the requirement to establish radio communications and receive information about air traffic activity. The pilot is solely responsible for establishing radio communications, is solely responsible for visually acquiring any air traffic reported by ATC and is solely responsible for applying the “see and avoid” concept for safe flight. In larger aircraft especially, it is impractical to expect the pilot to serve as a conduit between ATC and the skydivers aboard. While skydivers are often requested by the jump pilot to assist in locating other aircraft, it is enough that the pilot has established radio communications.

USPA proposes the following language change for that sentence:

“The pilot in command ~~and the parachutists on that flight~~ must have established radio communications...”

Advise the End of Parachute Operations

In paragraph (a)(2)(i), the FAA proposes to have the pilot, “*Continuously monitor the appropriate frequency of the aircraft’s radio communications system from the time radio communications are first established between the aircraft and air traffic control, until the pilot advises air traffic control that the parachute operation has ended for that flight; and*”

The language is essentially unchanged from the current rule, and would seem to require a radio call from the pilot when the last skydiver is on the ground (assuming that is when the parachute operation is considered to have ended). This is impractical since many turbine aircraft now descend faster than the skydivers who jump from it. Additionally, it often occurs that the jump aircraft descends below radio reception altitudes before the last skydiver lands, preventing the pilot from making a radio call.

In concert with proposed (a)(2)(ii), which would require the pilot to report when the last skydiver leaves the aircraft, a pilot should simply be required to monitor the ATC frequency until landed or unable to communicate.

USPA proposes the following new language for the paragraph:

“Continuously monitor the appropriate frequency...until the pilot ~~advises air traffic control that the parachute operation has ended for that flight~~ has landed or is no longer able to maintain communication with air traffic control;”

Advise of the Last Parachutist

The FAA proposes in (a)(2)(ii), *“Advise air traffic control when the last parachutist or object leaves the aircraft.”*

We support this new requirement for the pilot to report when the last jumper leaves the aircraft, which replaces the current requirement to report when the last jumper lands. With the proliferation of faster-descending turbine aircraft, it has become impractical for the pilot to report when the last skydiver lands. In many cases the aircraft lands before the last departed skydiver. In other cases, the aircraft is below radio reception altitudes before the last skydiver lands. A pilot report of the last departing skydiver is more practical, and indicates to air traffic control that skydiving has ended from that aircraft. However, this should not indicate to ATC that the airspace would not continue to be occupied by skydivers, either in **freefall** or under canopy.

USPA supports proposed paragraph (a)(2)(ii).

Inoperative Communications

The FAA proposes a new paragraph (b) *“If, prior to receipt of a required air traffic control authorization, or during any parachute operation in or into controlled airspace the required radio communications system is or becomes inoperative, any parachute operation from the aircraft must be aborted.”*

This would be a new requirement that all jumping cease as soon as the radio becomes inoperative, changing the current rule allowing a jump to continue if radio communication is lost after receiving an ATC authorization. While radio failure is rare, safety is maintained under the current requirement. If the failure occurs after receipt of an ATC authorization, ATC is fully aware of the time, altitude and airspace to be used for that jump operation, and can still observe the radar target of the jump aircraft. The current language regarding radio failure must be retained.

USPA proposes retaining the following language for paragraph (b), similar to the current language:

“However, if the communications system becomes inoperative in flight after receipt of a required ATC authorization or submission of ATC notification, the parachute operation from the flight may be continued.”

\$105.15 Information Required and Notice of Cancellation or Postponement of a Parachute Operation

Required Information

In paragraph (a), the FAA proposes, *“Each person requesting an authorization... and...submitting a notification...must include the following information...”*

USPA essentially supports the required information listed in this paragraph. The information outlined in this section is solicited for three different purposes, and for two

different types of FAA facilities. One purpose is to receive a Certificate of Authorization from an FAA Flight Standards District Office. A wholly different purpose is to request authorization (for skydiving in Class A, B, C, and D airspace) from an FAA air traffic control facility. A third purpose is to provide notification (for skydiving in Class E and G airspace), again to an air traffic control facility.

The FAA proposes, in paragraph (a)(S), *“The radio frequencies appropriate to the air traffic control facilities to be used, if required.”*

We note one inconsistency among the information requested. For paragraphs (a)(1) through (a)(7), all of the requested information is known to the jump pilot or jump proponent and thus easily provided. However paragraph (a)(S) solicits from the jump pilot or jump proponent the radio frequencies that can be used by ATC for the jump operation. In most cases, the pilot or jump proponent can not know of the possible frequencies until coordination is achieved with the proper ATC facility. We propose that paragraph (a)(S) solicit the name of the ATC facility with airspace jurisdiction, This will ensure that the jump pilot or jump proponent is aware of the correct facility with which to coordinate.

USPA proposes the following new paragraph (a)(S):

“The name of the air traffic control facility with jurisdiction of the airspace at the exit altitude(s) to be used for the parachute operation.”

\$105.17 Flight Visibility and Clearance from Cloud Requirements

In Section 105.17, the FAA proposes, *“No person may conduct a parachute operation, and no pilot in command of an aircraft may allow a parachute operation to be conducted from that aircraft --(a) into or through a cloud, or (b) When the flight visibility or the distance from any cloud is less than that prescribed in the following table:”*

We understand the necessity in applying the same minimum visibility and cloud clearance requirements to parachute operations as are applied to visual flight rules activity. However, we have two concerns. One is that precise horizontal and vertical distances from individual clouds are difficult to ascertain, both for pilots and for FAA enforcement officials. Throw in layered clouds and/or scattered cloud conditions, and the task becomes impossible. We hope that FAA inspectors recognize that jump pilots and skydivers make every effort to comply, but that occasional, inadvertent infractions occur.

Cloud Clearances

Second, with this regulation, the pilot can face enforcement action anytime skydivers enter clouds or violate the cloud clearance or visibility requirements. The regulation needs to be altered to relieve the pilot of responsibility when a skydiver's own actions cause him to enter a cloud or otherwise violate the minimum visibility and cloud clearance requirements. The FAA can and should take enforcement action, in the form of civil penalties, against skydivers who willfully or wantonly violate the rules. Enforcement efforts in these instances should target the guilty party.

USPA proposes the following new language for the section:

*“No person or parachutist may conduct a parachute operation--(a) into or through a cloud, or (b) When the **flight** visibility or the **distance from** any cloud is less than that prescribed in the following table. No pilot in command of an aircraft may allow a parachute operation to be **conducted from** that aircraft, unless the pilot has a reasonable expectation that the parachutist will avoid clouds at the distances prescribed in the table: ”*

\$105.19 Parachute Operations Between Sunset and Sunrise

Lights

The FAA proposes, *“No person may conduct a parachute operation, and no pilot in command of an aircraft may **allow** a person to conduct a parachute operation from an aircraft between sunset and sunrise, unless the person or object descending from the aircraft displays a light that is visible for at least 3 statute miles in all directions. ”*

This paragraph alters the current language by adding “in all directions.” If the intent is to ensure that a skydiver’s light can be seen from any point within three miles, the requirement is impractical and can not be met without two lights, one mounted on top of the canopy and one mounted beneath. If, on the other hand, the intent is to ensure the skydiver’s conspicuity roughly within his or her horizontal plane, then the common practice of mounting a light on a helmet can meet the new requirement. We argue for the latter intent, since an aircraft directly above or below a jumper at night is no safety factor.

USPA proposes the added language for the section:

*“No person may conduct a parachute operation, and no pilot in command of an aircraft may allow a person to conduct a parachute operation **from** an aircraft between sunset and sunrise, unless the person or object descending from the aircraft displays a light that is visible for at least 3 statute miles in all directions on a horizontal plane.”*

\$105.21 Parachute Operations Over or Into a Congested Area or an Open Assembly of Persons

The current rule requires an application for a Certificate of Authorization be submitted to an FAA FSDO at least four days before the day of the jump. Evidently, some FSDOs felt compelled to review and respond to the application within the four-day timeframe stated in the current rule. With today’s resource constraints, the FAA wants to remove this demand on FSDO workload. The proposed rule deletes the four day requirement. In effect, this will allow each FSDO its own leeway on turn-around time for a certificate. Some may still strive to provide quick service; others will insist on taking ten days, two weeks, or even 45 days to process an application.

While it is perhaps unreasonable to expect a four-day turn-around from the FAA, USPA requests the retention of a five-working day time limitation in the regulation. Most Certificates of Authorization are issued for demonstration or exhibition jumps for which

planning may be initiated close to the event, and it would be reasonable to request the agency to handle a certificate request within **five** business days of application.

USPA proposes the following new language for paragraph (b)(1):

“Be made to the local FSDO at least five business days before the day of the jump in a form and in a manner prescribed by the Administrator, and”

\$105.23 Parachute Operations Over or Onto Airports

In Section 105.23, the FAA proposes, *“No person may conduct a parachute operation...over or onto any airport unless...”*

We understand that the objective of this section is to ensure that all parties with responsibility for airports or airport operations are aware of, and approve of, a parachute operation before it is performed onto that airport. In fact, we support the FAA’s intent to clarify that coordination is necessary for jumps onto airports with control towers, regardless of whether the tower is federally- or privately-staffed. However, as constructed, the language improperly conveys too much authority to certain parties.

Airport Management Approval

In paragraphs (a)(1) and (b), the FAA proposes that, *“For airports with an operating control tower: Prior approval has been obtained from the management of the airport to conduct parachute operations over or onto that airport.”*

“For airports without an operating control tower, prior approval has been obtained from the management of the airport to conduct parachute operations over or onto that airport.”

This language is similar to that in the current rule. However, we can justifiably say that the current language, “Unless prior approval has been given by the airport management, no person may make a parachute jump..” has been the cause of more controversy, litigation, and FAA compliance workload than any other section in the FAR. We strongly urge the agency to take this opportunity to place more descriptive and clarifying language in this section.

We agree that airport management must be aware of a parachute operation prior to the event. We agree that the private owners of an airport have full latitude in deciding whether to accommodate a parachute operation, as do the operators of a publicly-owned airport that has not received federal airport grant funds. Operators of federally-funded airports, however, are often unaware that skydiving is recognized by the FAA as an aeronautical activity and enjoys FAA protection against unreasonable restrictions and economic discrimination. These airport operators eventually learn of skydiving’s status, but only after withholding approval for a parachute operation and forcing the skydiving proponent to seek administrative remedies through the FAA’s airports division.

The current rule however, leaves all airport managers with the wrong impression that approval may be withheld, and that that is the end of the process. USPA requests a new opening paragraph that makes clear that managers of federally-funded airports have an obligation to consider parachute operations as any other aeronautical activity. Subsequent paragraphs in this section should refer to coordination, not approval. Those airport owners and managers that have no obligation to accommodate skydiving do not have to accept coordination. Those airport managers that have an obligation to accommodate skydiving are required to coordinate with the skydiving proponent.

USPA requests that the section open with a new paragraph:

“Parachute operations are recognized by the FAA as a legitimate aeronautical activity that can be safely accommodated on most airports. For federally-obligated airports, coordination with airport management shall occur prior to parachute operations to ensure that all aeronautical users are safely and adequately accommodated.”

USPA also proposes the following revised paragraph (a)(1):

Prior ~~approval~~ coordination has ~~been obtained from~~ occurred with the management of the airport to conduct parachute operations over or onto that airport.”

USPA also proposes the following revised paragraph (b):

“For airports without an operating control tower, prior ~~approval~~ coordination has ~~been obtained from~~ occurred with the management of the airport to conduct parachute operations over or onto that airport.”

Tower Approval

The FAA proposes in (a)(2), “Approval has been obtained from the control tower to conduct parachute operations over or onto that airport.”

This language appears to conflict with Section 105.25 which simply requires an ATC authorization when parachute operations are to be conducted in Class B, C, and D airspace, which is essentially towered airspace. Therefore (a)(2) is unnecessary, since an ATC authorization is already required when jumping in Class B, C, and D airspace. Since there is only one FAA, surely the agency does not suggest that a skydiving proponent would need to contact two different ATC facilities and gain two different authorizations (or approvals) to conduct a jump. Granted, the jump would most likely occur at an altitude above the top of the Class B, C, or D airspace, and thus require the skydiving proponent’s coordination with an ATC facility that is not the control tower. However, the two facilities should be able to internally coordinate the proposed jump activity without requiring the proponent to work with the two separate facilities.

Further, once permission/coordination has been accomplished between the skydiving proponent and the airport management, approval from the control tower should not be necessary, though coordination would be. Otherwise, scenarios could arise where the airport management desires or is willing to allow a parachute operation, while the control tower facility withholds its approval.

USPA proposes the following revised paragraph (a)(2):

~~"Approval Prior coordination has been obtained from~~ occurred with the control tower to conduct parachute operations over or onto that airport."

Tower Communications

The FAA proposes in (a)(3), *"Two-way radio communications are maintained between the pilot of the aircraft involved in the parachute operation and the control tower of the airport over or onto which the parachute operation is being conducted."*

This paragraph is in conflict with § 105.13 (a)(2)(i), which requires the pilot to continuously monitor an ATC facility, presumably and correctly the facility with airspace jurisdiction at jump run altitude. The jump pilot should only be required to communicate with one ATC facility during the actual jump run operation (although certainly a pilot may need or desire to contact different facilities during a climb to jump run altitude, when the airspace of differing facilities overlaps).

USPA proposes the following revised paragraph:

"Two-way radio communications are maintained between the pilot of the aircraft involved in the parachute operation and the control tower of the airport over or onto which the parachute operation is being conducted, when the aircraft is in or transiting tower airspace."

Drifting Over Airports

The FAA largely retains the language in paragraph (c), *'A parachutist may drift over that airport with a fully deployed and properly functioning parachute if he is at least 2,000 feet above that airport's traffic pattern, and avoids creating a hazard to air traffic or to persons and property on the ground'*

The rule retains the provision allowing a person with an open parachute to drift 2,000 feet over an airport traffic pattern. In practice, this provision is rarely used, since nearly all parachute operations occur with intent to land on an airport. Occasional use of this provision may occur when parachutists perform a cross-country jump, in which the canopy is opened high at some calculated distance from the intended landing area. There are also *rare* occasions when exhibition jumps are made near--but not on--an airport, though exhibition jumps are certainly made on airports as well.

We desire some clarification in this section. An airport often has multiple traffic pattern altitudes, one altitude designated for single-engine aircraft, a higher altitude designated for multi-engine aircraft or turbines. In addition, traffic pattern widths are also highly variable, depending on aircraft approach speeds. Finally, most airports have two traffic patterns, one on each side of a single runway; airports with multiple runways have multiple traffic patterns. These variables **make** it virtually impossible for a parachutist to determine when he or she is at the required 2,000 feet over the airport traffic pattern in current use. We suggest that the rule simply require a parachutist to be 3,000 feet above the airport's elevation.

USPA proposes the following revised paragraph:

*“A parachutist may **drift** over that airport with a fully deployed and properly functioning parachute **if he** is at least 3,000 feet over that airport and avoids creating a hazard to air traffic or to persons and property on the ground.”*

\$105.25 Parachute Operations in Designated Airspace

ATC Authorization/Notification

In this section, in paragraphs (a)(3) and (b), the FAA proposes that: *‘No person may conduct a parachute operation... unless the air **traffic** control facility having jurisdiction over the affected airspace is **notified**...Each requestfor a parachute operation authorization or **notification** required under this section must be submitted to the air **traffic** control facility having jurisdiction over the affected airspace’*

These paragraphs would alter the current requirement to coordinate with the “nearest FAA air traffic control facility or FAA flight service station,” and instead require coordination with the “ATC facility having jurisdiction over the affected airspace.” We support the FAA’s intent to ensure that a jump pilot or skydiving proponent coordinates their intentions with the correct ATC facility. However, the rule should clarify that the proper ATC facility is the one with airspace jurisdiction at the altitude of jumper exit, since ATC airspace jurisdiction is often layered or stratified by altitude.

As noted in the preamble, the nearest facility is often not the correct facility for the airspace to be used. While the proposal corrects this by requiring coordination with the “ATC facility having jurisdiction over the affected airspace,” we believe that this is happening anyway. However, we contest the implication, contained in the preamble, that this change is necessitated by an increase in near mid-air collision reports involving skydivers and jump aircraft.

USPA supports the intent in paragraphs (a)(3) and (b) to coordinate with the “air traffic control facility having jurisdiction of the affected airspace.” However, as we have already suggested in earlier sections, additional language is necessary to clarify that the facility with airspace jurisdiction at the exit altitude(s) is the proper facility for coordination.

USPA suggests the following change for paragraph (a)(3):

*“Except as provided in paragraph (c) and(d) of this section, within or into Class E or G airspace area unless the air traffic control facility having jurisdiction over the ~~affected~~ airspace at the intended exit altitude(s) is **notified** of the parachute operation no earlier than 24 hours...*

USPA suggests the following change for paragraph (b):

*“Each requestfor a parachute operation authorization or **notification** required under this section must be submitted to the air **traffic** controlfacility having jurisdiction over the ~~affected~~ airspace at the intended exit altitude(s) and must include...”*

FSS and NOTAMs

The FAA's proposed changes to Section 105.25 delete any reference to FAA flight service stations (FSS) from this paragraph, and thus from the entire rule. Though FSS is mentioned in the current rule, there is no current requirement for a skydiving proponent or jump pilot to contact a flight service station, nor to file a NOTAM at any point during coordination. However, filing a NOTAM for parachute jump activity has become industry practice. Skydive centers with over 4,000 annual jumps are allowed to submit a written request that results in the issuance of an FDC NOTAM, publication of the jump activity in the Airport/Facility Directory, and placement of a parachute icon on sectional aeronautical charts. Skydive centers with fewer than 4,000 operations typically telephone the nearest FSS within 24 hours of the proposed activity, which results in the issuance of a NOTAM (D) (distant NOTAM) only

In the preamble, the FAA suggests that air traffic controllers will be responsible for advising flight service stations of parachute activity. Presumably this would result in the issuance of a NOTAM. However, we do not think this will work. Currently, and as proposed, for jumps in Class E and G airspace (where 99 percent of jump activity occurs, by our estimation), jump proponents are allowed to submit annual written notification to ATC, covering jump activity for up to one year. Currently, and as proposed, once notification is submitted, the jump operation's only other requirement is to contact ATC at least five minutes prior to each drop. Unless the NOTAM system is changed to allow ATC to provide FSS with an annual notification of jump activity for all skydive centers (after receiving written notification from the center), the five minute radio call does not provide ATC or FSS enough time to file a NOTAM.

USPA requests a change to the NOTAM system that would allow an on-going skydive center to submit an annual written notification to the nearest FSS that would result in: issuance of a NOTAM D; a listing in the Airport/Facility Directory; and placement of a parachute icon on sectional charts. (This notification to FSS would be separate and apart from the notification to the ATC facility with jurisdiction over the airspace of intended exit altitude(s), which we support.)

Class E and G Airspace

Paragraph (c) proposes *“Air traffic control may revoke the acceptance of the notification for any failure of the organization conducting the parachute operations to comply with its terms.”*

This paragraph would allow for “notification” of ATC when jumping in Class E and G airspace, but then allow ATC to “revoke the acceptance of the notification” when the jump operation “fails.. .to comply with.. .terms.” First, the concept of revoking a notification is incongruous. Notification involves one party providing notice, and a second party receiving notice. It seems a stretch of the concept to allow the second party to “revoke” notification, or in essence give back or deny receipt of notification. Second, the question is raised about which terms demand compliance. Class E and G airspace is VFR airspace. For parachute operations in this airspace, ATC essentially receives notification; ATC does not issue authorization, terms, or agreements. Therefore the only

“terms” that require pilot compliance are the federal aviation regulations. If the regulations are not complied with, the FAA has enforcement authority, which is the proper process to use. Revocation of parachute jump notification is not the proper process.

USPA requests deletion of the sentence cited above from paragraph (c).

\$105.27 Accident Reporting Requirements

In Section 105.27, the FAA proposes a new requirement, “*The FAA must be notified within 48 hours of any parachute operation resulting in a serious or fatal injury to a parachutist by—(a) Each parachutist involved in the accident, or (b) the pilot of the aircraft, or (c) The drop zone owner or operator.*”

USPA has deep concerns with this new proposal which imposes a reporting requirement for all serious and fatal injuries.

USPA questions the FAA’s need for this data. In fact, the FAA claims no need itself for the data, but refers to a recommendation from the National Transportation Safety Board that the agency collect data on parachute accidents. However, the FAA states that the data will be used to assess the safety of parachute operations and prevent future accidents. This is a huge departure for the agency, which has long recognized USPA for its skydiving expertise and for its self-regulation of the sport. We question how the FAA will assess either the safety data or the safety of parachute operations.

This proposal also ignores USPA’s incident reporting system, which gathers similar data. To our knowledge, the FAA has never requested information about injuries or fatalities from our database.

At 44 reports per year, as cited in the preamble, the FAA grossly underestimates the number of reports that would result from a reporting requirement. USPA’s membership renewal form, which must be completed annually by continuing members, solicits information about skydiving injuries in the preceding year. During 1998, over 1,376 members reported injuries of all types, from minor to serious.

Additionally, USPA has in place a formal fatality reporting program, by which we nearly always receives skydiving fatality reports within one or two days of occurrence, and often in under 24 hours. These fatality reports, which contain a wealth of information, are vital to our safety and educational efforts. USPA is gravely concerned that a federal reporting requirement will impair USPA’s reporting program, resulting in diminished information and educational value for all skydivers.

The rule proposes that reporting responsibilities be shared by jump pilots, drop zone operators, and parachutists themselves. We believe this to be unworkable, with each thinking that the other will file the report. Of the ~~three~~, jump pilots are in the worst position to know if there has been a skydiving injury or fatality from their aircraft,

especially at a busy facility. Turbine pilots are often back on the ground, loaded up and taking off when the skydivers who last left the aircraft are landing. There is often no conceivable way for a jump pilot to know if a jumper has been injured. At facilities with multiple aircraft in operation, it may even be impossible for any pilot to determine whose aircraft the injured skydiver departed until manifest records can be checked.

USPA opposes any requirement for anyone to report skydiving accidents or fatalities to any government agency. We strongly urge deletion of the language in Section 105.27.

\$105.43 Use of Single-Harness, Dual-Parachute Systems

Who Can Pack a Main Parachute

In paragraph (a) the FAA proposes, *“The main parachute must have been packed...by...a non-certificated person under the direct supervision of a certificated parachute rigger.”*

USPA supports the change that would allow the main parachute to be packed by anyone under rigger supervision. This expands on the current requirement that a main parachute may only be packed by the person about to jump it, or by a certificated rigger. As the agency knows, industry practice now accepts the use of non-certificated parachute packers to pack main parachutes. There is no evidence that the level of safety has decreased as a result.

As the agency knows, the definition of the term “supervision” is crucial to this concept. In its definition of the term “supervision,” the FAA appears to adapt a paragraph found in FAR Part 43, section 43.3 (d), which describes how a person may perform maintenance on an aircraft while under the supervision of a certificate holder. Modifying the paragraph for parachute purposes, the FAA proposes, *“Supervision means that a certificated rigger personally observes a non-certificated person packing a main parachute to the extent necessary to ensure it is being done properly.”*

The paragraph cited above provides the supervising rigger with the leeway to determine the extent to which the rigger needs to observe the pack job. A rigger who knows the quality of the packer’s work need not be physically adjacent to the packer; a rigger who knows the packer less well may choose to be present throughout the pack job. In any case, we request that the supervising rigger should be on the premises, and thus personally available for consultation. This would not allow the rigger to be participating in jump operations, or to leave the premises, however briefly, while he or she is supposed to be supervising a packer’s work.

USPA proposes deletion of the word “direct” from Section 105.43 (a).

USPA also requests the following changes as the definition of “supervision” in Section 105.3 of this part. *“Supervision means that a certificated rigger personally observes a non-certificated person packing a main parachute to the extent necessary to ensure it is being done properly, and the rigger is readily available. in person, for consultation.”*

120-Day Cycle for a Main Parachute

In paragraph (a) the FAA proposes, *“The main parachute must have been packed within 120 days before the date of its use ”*

The current rule, unchanged by the proposal, requires that a main parachute has been packed within 120 days before the date of its use. This should be eliminated as there is no practical method of determining compliance with the requirement. There are no packing data cards for main parachutes. Further, a limiting date on main parachute packing is a carry-over from the original 1963 regulation, when some main parachutes in use were made of organic materials. Today, ram-air canopies made of wholly synthetic materials are the norm, and with their high reliability clearly established, there is no longer a need for a packing date limit on main parachutes.

USPA proposes the following language for paragraph (a):

“The main parachute must have been packed ~~within 120 days before the date of its use~~ by a certificated parachute rigger, the person making the next jump with that parachute, or non-certificated person under the ~~direct~~ supervision of a certificated parachute rigger.”

The Reserve Parachute

The current rule, unchanged by the proposal, maintains a 120 day repack cycle for reserve parachutes. USPA believes that parachute materials and packing methods have sufficiently advanced to a state that allows for a six-month *reserve* repack cycle. Full justification for this position is separately provided near the end of the comments,

Automatic Activation Devices

In paragraph (b)(3), the FAA proposes new language, *“If installed, the automatic activation device must be maintained in accordance with manufacturer instructions for that automatic activation device. ”*

As proposed, and for the first time, regulations would specifically address automatic activation devices. This section would require that, if installed, an AAD would be maintained in accordance with the manufacturer’s instructions. USPA questions the necessity of a regulation in this area for the following reasons. An AAD is not approved, reviewed, or **certified** by any standard-setting body, including the FAA. Even so, with this rule, the FAA would treat aircraft and aircraft components in a more lenient manner. To be clear, AAD manufacturers have established “service” guidelines that are distinct from “maintenance.” Just as with aircraft and their components and the “service bulletins” issued by aircraft and component manufacturers, the FAA ought to allow owners the freedom to determine compliance. The rule’s proposal with respect to AADs would be analogous to the FAA requiring aircraft owners to comply with service bulletins.

USPA recommends the voluntary use of AADs by experienced skydivers, USPA Group Member skydiving facilities are required to provide functioning AADs for all student jumps. Further, USPA requires that those AADs provided for students meet the manufacturer’s recommended service schedule.

However, we oppose any reference to AADs in Part 105, as inclusion brings several questions that are not addressed, principally, if the installed AAD has not met a manufacturer-required maintenance milestone, does that render the parachute system unusable? Would the parachute system be unusable whether or not the AAD is turned on? We do not believe that the FAA wants to be in the position of interpreting the answers to these questions, nor enforcing those interpretations. The FAA should be satisfied that those AADs provided to students are meeting manufacturers' maintenance schedules. Conversely, the FAA need not be concerned with the operation or condition of AADs voluntarily installed at personal expense by experienced skydivers.

Finally, the current rule, unchanged by the proposal holds the pilot responsible for verification of the parachute equipment requirements contained in this section. This has become unnecessary and impractical. First, there is no possible method for a jump pilot to determine if the main parachutes worn aboard the aircraft were packed by the appropriate person within 120 days prior to their use. Second, while there is a method to verify reserve pack dates with the packing date card for each rig, it has become impractical for pilots to physically check the cards, especially the pilots of larger aircraft at busy facilities. Third, if the AAD maintenance language is retained, again there is no method or documentation available for a pilot to verify compliance.

USPA requests deletion of paragraph (b)(3) in its entirety.

\$105.45 Use of Tandem Parachute Systems

In Section 105.45, the FAA proposes a completely new section detailing requirements for the allowance of tandem parachute operations.

As the preamble notes, in July 1997 USPA petitioned the FAA for rulemaking to permit tandem parachute operations. That petition requested a simple change to the regulation that simply acknowledged the use of tandem harnesses and equipment, then required that tandem jumps be made in accordance with a program approved by the Administrator, such as USPA's tandem program.

Instead, the agency chose to codify tandem instructor qualifications, the certification process, details of a necessary student briefing, and tandem equipment requirements. While USPA appreciates the FAA's intent to allow tandem jumps by regulation instead of by exemption, we are adamantly opposed to the approach taken because it specifically infringes upon USPA's tandem program and universally infringes on the concept of self-regulation.

Over the past 15 years, USPA has worked closely with tandem manufacturers and others to develop a tandem program that ensures the highest levels of safety. We have established: qualifications for tandem instructors; an instructor certification process; minimum equipment requirements; training syllabi; and targeted learning objectives. Nearly all of this work and the program itself would be obviated by codification in the

FAR. Moreover, USPA often makes use of the ability to easily change and upgrade program and equipment requirements. For instance, if we determine that an instructor candidate needs 600 jumps instead of 500, or needs to be 19 years of age instead of 18, we can quickly change the requirement. The FAA does not have the same ability to quickly enact necessary changes.

There are important differences in the FAA's proposed tandem program and USPA's existing program. USPA specifies age 18 as a minimum age to be qualified as a tandem instructor; the FAA does not address the age issue for instructors. USPA requires a tandem instructor to possess a third class FAA medical certificate; the FAA proposal would not. These differences are cited to establish that USPA has a well-thought-out tandem program in place. The FAA ought to respect that program and not attempt to codify it in regulation.

In its proposed section, the FAA uses new terminology, which is also defined, namely "tandem parachute operation," "tandem parachute system," "parachutist-in-command," and "passenger parachutist." The new lexicon does little to clarify the tandem program, and may well confound it. In any case, the terms, "parachutist-in-command" and "passenger parachutist" are ill-chosen, since they strongly borrow from Part 91 concepts, bringing tandem instructors and students dangerously close to identification with aircraft "pilots" and "passengers."

USPA requests the insertion of the following paragraph to Section 105.43, which is the specific language, submitted earlier by petition, that we believe to be the maximum necessary to allow tandem skydiving as part of the regulation:

"No person may make a parachute jump, and no pilot may allow any person to make a parachute jump from that aircraft, unless that person is wearing an approved harness attached to a parachute pack having at least one main parachute and one approved auxiliary parachute that are packed as follows..."

USPA also requests the addition of this new paragraph to the section:

"Tandem parachute jumps must be conducted in accordance with a program approved by the Administrator."

USPA also suggests use of the following paragraph as the definition of "tandem parachute jump" in Section 105.3 of this part:

"Tandem parachute jump -means a parachute jump with more than one person simultaneously utilizing the same parachute assembly."

\$105.47 Use of Static Lines

In July 1997, USPA petitioned for changes to current Section 105.43 that would clarify that a static line assist device is not required for direct-deployed ram-air parachutes. The FAA has addressed this issue satisfactorily in the NPRM, except for the inadvertent omission of one word. We request the following change in paragraph (c): "*An assist*

device is not required for parachute operations using direct-&g deployed, ram-air canopies. ”

\$105.49 Foreign Parachutists and Equipment

In July 1997, USPA also petitioned for changes to the rules applied for foreign nations skydiving in the U.S. Currently, Part 105 allows only approved parachute assemblies (i.e. equipment approved under a technical standard order) for use in the U.S. Several operators of skydiving facilities currently petition for exemptions that allow a foreign national to jump with his parachute assembly even if not approved in the U.S. It appears that the FAA proposes to alter Part 105 to address USPA’s concern and allow foreign nationals to jump their own equipment without the need for anyone to petition for an exemption.

However the section needs some clarification. Once in this country, the foreign rig should be subject to the U.S. repack cycle (currently 120 days). The 120-day clock should start from date of the reserve’s last repack, not from the date the rig enters the U.S. As proposed, the FAR would not allow a non-certificated packer to pack a foreign main parachute. USPA proposes that packers be allowed to pack a foreign main.

USPA requests the alteration of what should be paragraph (a)(4)(i) to read,
“The main parachute must be packed by the foreign parachutist making the next parachute jump with that parachute, or a certificated rigger, or a non-certificated person under the supervision of a rigger.”

\$65.111 Certificate Required

The FAA proposes, in new paragraph (b)(2), *“No person **may pack, maintain, or alter any main parachute of dual-parachute system to be used for intentional parachute jumping... unless that person--Is under the supervision of a current certificated parachute rigger.**”*

In this paragraph the FAA proposes language that would allow any non-certificated person to pack a main parachute if under the supervision of a rigger. USPA supports this intent and language.

The FAA also proposes a new paragraph (b)(4) that allows a “parachutist in command” to pack a tandem main parachute. Earlier USPA argued against the FAA’s proposed approach to the allowance of tandem jumping. By incorporating USPA’s original language, contained in a USPA petition, which would allow tandem jumping, the rule would not require this new paragraph in Section 65.111.

USPA requests the deletion of proposed Section 65.111(b)(4).

§65.125 Certificates: Privileges

Supervision of Packers

The FAA proposes new (a)(2): *“Supervise other persons in packing any type of parachute for which that person is rated in accordance with section 105.43 (a) or section 105.45(b)(1) of this chapter.”*

and (b)(2): *“Supervise other persons in packing, maintaining, or altering any type of parachute for which **certificated parachute** rigger is rated in accordance with section 105.43 (a) or section 105.45(b)(1) of this chapter.”*

The FAA proposes new language in this section that would allow anyone to pack any main parachute while under the supervision of a current certificated rigger. USPA supports the new paragraphs which clarify that a rigger may supervise non-certificated persons to pack any main parachute.

§ 119.1 Applicability

Section 119.1 clarifies that non-stop skydiving flights conducted within 25 statute miles of the departure airport are not subject to certification by the FAA as a commercial operator. This has proven to be overly restrictive. USPA requests a change to permit skydiving flights within 100 statute mile of the departure airport.

Most drop zones have parachutists land on or adjacent to the airport used for take-off and landing; this section does not restrict those operations. This section does, however, restrict a number of demonstration or exhibition jumps, most of which are made at a location often distant from an airport, such as a stadium, a park, a downtown area, etc. As currently written, no demonstration jump can be made more than 25 miles from an airport. A change to a 100 mile radius would lessen restrictions on parachute activity with no derogation in aviation safety.

USPA requests the following change to paragraph (e)(6):

“Nonstop flights conducted within a ~~25-~~ 100-statute-mile radius of the airport of takeoff carrying persons or objects for the purpose of conducting intentional parachute operations.”

RESERVE REPACK CYCLE

USPA proposes a rule change that would extend the repack cycle for sport reserve parachutes to 180 days from the date of the previous pack. This proposed change is also supported by the Parachute Industry Association.

In its 1962 rulemaking that first created Part 105, the then-Federal Aviation Agency retained a 60-day repack cycle that was then found in Part 43 for other than a chair-type parachute. This 60-day requirement had been in place since before 1920. Though parachutes made of synthetic fibers were in existence, many parachutes of that time were

composed of natural fibers such as silk and cotton, which were subject to degradation. A sixty-day period was determined to be a reasonable length of time between inspection and repack of reserve parachutes.

Over the years, the FAA twice enacted rule changes that lengthened the repack cycle for parachutes made of synthetic materials-first to 90 days, then *to* the current 120 days. The last change was enacted in 1978. A **60-day** repack cycle has always been retained for parachutes made of natural fibers.

Parachute fabrics, construction methods and packing methods have all greatly improved since 1978, when the cycle was last changed. These improvements alone argue for a relaxation of the 120-day repack rule.

Importantly, there is already a favorable record established for a **180-day** reserve repack cycle, since several countries already allow it, including the following:

- France
- 
- Sweden
- Australia
- New Zealand
- Great Britain

(It is interesting to note that some of these countries instituted a six calendar month cycle instead of a **180-day** cycle. The justification seems to be that it is easier to confirm the actual date of expiration at the end of a month, as opposed to the **180-day** cycle which requires counting each day.)

Several of the countries noted above enacted the lengthened cycle some years ago: Sweden in 1979; New Zealand in 1987; and Germany and Australia in 1994. None of the aviation nor parachuting authorities in those countries report any decrease in safety or increase in incidents as a result of the changes.

In addition, there have been several studies performed relating parachute opening and performance with the length of time since the last repack. We submit excerpts and narratives from those studies as appendices to these comments. Appendix 1 is a report entitled, “The Effect of Repack Interval on Ram-Air Reserve Deployment Time.” Appendix 2 is entitled, “PIA Position On A **180 Day** Repack Cycle,” which lays out the findings of the Parachute Industry Association’s Technical Committee. The committee’s findings were largely the basis for PIA’s vote endorsing a **180-day** repack cycle.

USPA requests the following change to proposed Section 105.43:

*“(b) The reserve parachute must have been packed by a **certificated** parachute rigger-
(1) Within ~~120~~ **180** days before the date of its use, **if its** canopy, shroud, and harness are composed exclusively of nylon, rayon, or similar synthetic fiber or material that is*

substantially resistant to damage ~~from~~ mold, mildew, or other fungi, or other rotting agents propagated in a moist environment; or"

CONCLUSION

USPA is proud of the long-standing relationship with the FAA that allows the sport of skydiving to be "self-regulated." We believe USPA's programs have shown over the years that skydiving can easily co-exist with all other forms of aviation. We further believe that we have shown that the FAA should largely concern itself with the safety of air traffic and the safety of persons and property on the ground, with respect to skydiving. We urge the FAA to carefully evaluate the proposals that infringe on USPA's ability to effect the safety of the skydiving individual.

USPA appreciates the opportunity to comment on the proposed changes. We recognize and appreciate that the FAA is supportive of changes that were the subject of petitions submitted by USPA in 1987. The FAA is also attempting to update the regulations to better reflect the evolution of skydiving practices, procedures and equipment. We appreciate the time and resources the agency has devoted to the drafting of the NPRM.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "C. J. Needels".

Christopher J. Needels
Executive Director

The Effect of Repack Interval on Ram-Air Reserve Deployment Time

Introduction

This brief report describes a series of drop tests undertaken to determine if “time since last repack” had a significant effect on the inflation times of ram-air reserve parachutes.

Equipment

A variety of TSOed reserve parachutes and piggyback rigs were used for the tests. All were personal gear that was in typical “field use” at the time of test jump. The reserves had been routinely packed for their owners by certificated riggers; the reserves were not packed specifically for drop testing.

Two of the reserves (126 and 143 sq.ft.) were packed the day before they were jumped. These are called the control canopies.

In the other six jumps, the reserves had been repacked from 199 to 933 days before they were tested. The reserves for those jumps ranged in size from 126 to 150 sq.ft. They are called the test canopies.

Methodology

A skydiver made a series of eight intentional breakaways from ram-air canopies in full flight. He pulled the reserve **ripcord** after a delay of 1 to 2 seconds. The breakaway and subsequent reserve deployment were Nmed by a second jumper who was flying his canopy nearby. The resulting video tape was later analyzed by a technician who counted video frames to prepare a **chart** below.

The jumps were made in late 1994 and early 1995 at **DeLand, Fla.** The jumps and subsequent analysis were performed in accordance with Section 4.6.3.2 of NAS 8015(B).

Kelly **Farrington** made the test jumps. Brian Rogers filmed them, and Wes Rich helped analyze them and produce an edited video of the tests. All three skydivers have considerable experience conducting and documenting such tests for several parachute companies located in **DeLand**.

Results

A chart on the following page summarizes the results. A key to the abbreviations follows it. All times are in seconds.

Here are the results of a series of jumps involving ram-air reserves that had been packed for varying lengths of time. The numbers are time in seconds, as determined by counting video frames.

Jump	DEL	COB	since FOC	Days	
				TDT	pack
Control 1	1.70	.97	1.67	2.63	1
Control 2	1.13	1.43	2.23	3.67	1
Test 1	1.13	3.07	1.37	4.43	933
Test 2	1.33	1.33	2.23	3.57	366
Test 3	1.47	1.03	1.67	2.90	446
Test 4	1.13	1.37	2.67	4.23	466
Test 5	1.33	1.00	2.70	3.70	440
Test 6	1.23	1.33	1.50	2.63	199

DEL: The freefall delay from main riser separation until first sight of the reserve pilot chute.

COB: Canopy Out of Bag. The time from the first sight of the deploying pilot chute until the freebag is pulled off the reserve canopy.

FOC: Functionally Open Canopy. The time from the canopy's extraction from the freebag until it is inflated with slider down.

TDT: Total Deployment Time. The time from first sight of the reserve pilot chute until the reserve is functionally open. COB + FOC = TDT

Conclusions

From the results of this limited series of tests, it appears that the time since last repack has little affect on the deployment times of sport ram-air reserve parachutes.

Some riggers had predicted that ram-air reserves that had been packed more than 120 days would deploy poorly because of what they loosely termed "the brick factor." The investigators did not see any evidence of such an effect.

The test reserves had been packed continuously for 199 to 933 days before they were jumped, while the controls were packed the day before. In some instances, the test reserves opened more slowly than the controls, but in others they opened faster.

The group will continue the test-jump program to expand the database. Jumps will also be made on reserves that had been packed about 120 days.

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PIA Position On A 180 Day Repack Cycle

*The following document represents the position of the Parachute Industry Association regarding the 180 Day Repack Cycle. This document is the result of more **than** 50% vote response and a greater than 3 to 1 margin for its passage.*

*To download **and print** the following **document**, please click [HERE](#). The .pdf file associated with **this** link and required to **print** this document must be viewed **and printed** using the Adobe Acrobat Reader.*

Comments on the 120 Day vs. 180 Day Repack from the PIA Rigging Committee:

At the January 1999 PIA meeting the Rigging Committee discussed the proposed endorsement of the 180-day repack cycle by PIA. Some on my committee are not opposed to the 180-day repack cycle in theory and feel it will happen in the future. What we are concerned about is a blanket endorsement by PIA without further testing and documentation to support the proposed change.

We have not been shown any supportive information and/or testing done by current manufacturers as to the reliability of the materials, such as O porosity and O-3 cfm (F-111), used in modern canopy construction. How will they react packed over extended periods of time? Will the opening times be the same? Will heat and humidity affect reliability? The only data available at the January meeting was from the 50's and 60's. We need current supportive evidence supplied by the manufacturers to which riggers can refer.

Other questions arise. What do we do with the orphaned canopies manufactured by out of business companies? Do we keep them at 120 days or should they also go to 180 days? Riggers, instead of the manufacturers who should be the most familiar with their own products, could now be responsible for advising their clients on the 180 day repack cycle but would have no supporting data. This leads to the liability issue and might expose riggers to potential lawsuits.

Some riggers like myself could probably be convinced to support the 180 day repack because I will charge more and pack less, BUT not without documentation provided by the manufacturers of the parachutes we maintain.

We suggest PIA and individual voting members not endorse the 180-day repack cycle until such time as sufficient supportive material is available to protect the rigger and his or her clients.

*Comments on the 120 Day vs. 180 Day Repack
from the **PIA** Technical Committee:*

What is a rigger certifying when he signs the data card?

Does the need for regular maintenance justify the 120-day cycle, or even a shorter cycle?

The technical committee believes that the inspections and the maintenance are two different things. The best way to approach this issue is to draw a parallel to aircraft inspection and operation:

An aircraft may not be flown in the US unless an appropriately certified individual has inspected the aircraft within the past year. However, the fact that the inspection has been signed off does not mean that the aircraft is airworthy or will continue to be airworthy. The regulations state that it is the aircraft operator's sole responsibility to determine that the aircraft is airworthy, and he must do so before each and every flight. The date of the last annual inspection is only one of the items that must be checked. If the operator's preflight inspection indicates something is not airworthy, he must correct the problem if the regulations permit him to do so, or find a properly certified individual to correct the problem before he flies the aircraft.

We interpret the current parachute regulations in the same way. When a rigger has signed off a pack job, he is signing off that he did the inspection and pack job correctly and has completed any maintenance necessary at that time. He is not certifying that the user will not damage or destroy the parachute before the next repack is due. The sole responsibility for determining the airworthiness of the parachute system lies with the operator of that system, and a current repack sign off is only one of the items that needs to be checked.

In both the aircraft and parachute arenas, the time based inspections are a convenient time to do any maintenance, but those inspections are not the only time maintenance is appropriate. The actual need for maintenance is determined by the extent of use in between these inspections. Some parachute systems may need maintenance weekly if subjected to a high level of use or abuse, but that is separate from the need for repacking of the parachute purely based on elapsed time.

Do some parachutes require more frequent inspections than 180 days, due to the nature of materials used in manufacture?

Yes, parachutes made with natural fibers. These materials, such as silk or cotton, are subject to mold, mildew, and rot. Proper storage of such parachute systems is critical to proper functioning. There are probably very few of these systems in use. The FAA originally created a repack cycle of 60 days due to the limitations of these materials. In the 1940s, parachutes made with man made fibers came into use, and with newer systems, mildew, mold, and rot are no longer a big problem if a parachute is kept reasonably clean and dry. The FAA, not willing to totally forgo the time based inspection system, eventually changed the repack cycle to 90 days for parachutes made with no natural fibers, then later to 120 days. PIA is an international organization, and several of our members come from countries where the cycle is 180 days.

In all the governing organizations polled by the technical committee in countries that have changed to a 180 day cycle or longer, there were no reports of any increase in system problems due to the length of time a system had been packed. For example, Great Britain requires a report of every malfunction or deployment problem and receives approximately 300 per year. During the time they have had a six-month cycle, "none of the reports have suggested that any of the malfunctions or deployment problems were caused or influenced by extending the cycle." Also they reported that there was, "no mention of any deterioration

in any of the components, including rubber bands.. in systems opened for repack, sometimes for a year or more.” All the other countries reported similar results.

Should parachute manufacturers stipulate their own inspection cycles as do the aircraft manufacturers?

The case could be argued, and there are some people on the committee who feel that they, as manufacturers? know their system better than anyone, and **certainly** well enough to **stipulate** a longer inspection cycle than 180 days. However, the committee is not currently proposing **this**.

In some military organizations, the cycle ranges from 180 days to six years, depending on the type of system, and the environment in which it is stored and used. Currently, there is no vehicle to allow this in the US civilian parachuting arena.

There is no question, however, that if a material used in **future** designs has environmental limitations that require more frequent repacks, they have the responsibility and the obligation to stipulate more frequent inspections in this case, and the FAA should allow this. The TSO tests include harsh environmental tests that should uncover this situation, and any reputable manufacturer would certainly do a thorough job in researching any unproven materials used in new parachute systems.

Might frequent repacking adversely effect the airworthiness or performance of some parachutes systems?

In some cases, definitely yes. Parachutes made with very low porosity fabrics, (O-3 cfm permeability) do experience some degradation in performance due to an increase in porosity caused by handling the fabric during packing. In particular, for ram air parachutes, the change is quite noticeable, and can lead to the parachute eventually failing to meet TSO standards. For this reason, the Technical Committee is recommending that the repack cycle be extended to at least 180 days on ram air parachutes. Since the performance degradation is less severe on round canopies, the technical committee has not formed an opinion on extending the cycle for round canopies.

With few exceptions ram air reserves are made with a very low porosity fabric, for greater resistance to high speed tearing as well as great environmental stability. There is also a great deal of good experience with this type of fabric. Unfortunately, the trade off is an increase in porosity due to handling. By minimizing the frequency of repacking, the canopy's porosity is maintained proportionally longer, resulting in greater safety for the user. A summary of the evidence for this follows:

The Belgian Army Para School Testing:

The Belgian Army has conducted an extensive long-term study of parachute wear on systems used by the school. They were very interested in the effect of high altitude deployments possibly accelerating the performance degradation they were experiencing on their main canopies. From the first part of their study, they concluded that there was no direct relationship between the exact number and type **of jumps** and the degree of increase in porosity measured, though the porosity increase was great enough to effect performance. They also concluded **that the handling during packing was much more detrimental to the parachute than the actual deployment and use.**

This led the Belgian Army to question their beliefs about their reserve parachutes, “which we assume(d) stay brand new forever.” In checking some reserves in their systems, they found porosity readings as high as **18 cfm in some areas of a parachute after only 30 repacks had been performed.** A full 32% had porosity readings of more than 9cfm, with **all** parachutes tested having a porosity of at least 5 cfm in the center cell. The original mil specification, now a PIA specification, for the fabric used on this particular fabric requires O-5 cfm when new. Among their conclusions was their standard practice of reusing a reserve canopy as a main without further checks had to be changed, and, **“A reserve doesn’t stay a brand new canopy.”** They also concluded that the idea of, “having a check up after (a certain number of) repacks is not a bad idea.” Note that the emphasis is on the number of repacks, not the period of elapsed time, because **it is the handling during the repack that causes the wear.**

Study by Precision Aerodynamics Inc. on Parachute handling vs. Porosity:

Precision, like most manufacturers, knows that all Ram Air parachutes built with conventional low porosity fabric are adversely affected by handling of the fabric. A study was recently accomplished where 10 different fabric samples were handled 16 times using methods typical of the packing of a parachute. Four samples were from a well-known company that no longer manufactures fabric, but is commonly seen in parachutes manufactured several years ago. The samples were in new condition and had minimal handling. The other six samples were representative of more modern O-3 cfm fabric commonly used at this time. Among Precision’s conclusions were:

After testing, the fabric had porosity increases ranging from approximately four-fold to slightly over twelve-fold compared to before testing. The fabric of newer design has generally better porosity characteristics, in that the fabric starts at lower porosity before handling, and does not degrade to as high a porosity as the fabric of older design. The porosity increases seen in these tests were representative of porosity increases seen on actual parachutes in service. The porosity increases seen on actual parachutes are due to the handling of the parachutes, mainly during the packing process. Parachutes that undergo such a porosity increase may not pass the TSO tests under which the parachute was originally certified. See attached graph.

Precision Aerodynamics Canopy Fabric Study 5/99

Study by Performance Designs Inc. on actual opening and landing characteristics of reserve parachutes:

Performance Designs conducted a study of porosity of 18 reserve parachutes they manufactured between April 1990 and May of 1998. The parachutes ranged in size from 126 square feet to 218 square feet. After measuring the porosity on all the canopies, the company selected one large and one small parachute that had the highest porosity. These two parachutes were then packed and deployed from reserve containers after an intentional cutaway in the same manner as is done for TSO testing. The result was a noticeable increase in the time and distance required for both parachutes to open, and a very noticeable increase in the skill required to land the smaller parachute softly. The parachutes had been packed 10 and 14 times respectively, and both had only been deployed once before. While both parachutes performed reasonably well at this stage, considering the amount of handling they

have had in that number of repacks, they are still far **from** the porosity level that they will attain after many more such pack jobs. Like any ram air manufactured using similar fabric, these parachutes may degrade to a condition where they may not pass TSO tests. They will certainly degrade to a point that the landing characteristics will not be acceptable to their owners or to the standards of the manufacturer, even if they do pass the TSO tests for landing performance.

Conclusions:

As shown by the supporting evidence above, it can be seen that there is no valid safety related justification for continuing with a **120-day** repack cycle. There is however, a valid safety related reason for a longer repack cycle for ram air reserves. On parachutes made with very low porosity fabrics, most of the wear of the parachute canopy occurs during the packing procedure, rather than in the use (deployment) of the parachute. This wear can lead to a degradation of the parachute's performance over series of repack cycles. In the case of ram air parachutes, this degradation may get to the point that the parachute may no longer be able to pass the original TSO tests used for the original certification. Specifically, the landing performance is compromised,, as is the time and distance required to open. As the trend to smaller, more efficient ram au reserve parachutes continues, the ram air designs depend more and more on the improvements in porosity characteristics of the fabric they use. Lengthening the repack cycle will improve safety of ram air reserve parachutes. A corresponding safety related reason for a longer repack cycle on round reserves is that the porosity increase results in an increased rate of descent, however this was not studied extensively by the technical committee.

For these reasons, the technical committee suggests that the voting members of PIA support a change to a 1 SO-day repack cycle.

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